

CLAIMS

1. A data storage apparatus comprising:

a video signal receiving section for receiving a video
5 signal representing video and aspect information to control
aspect ratio of the video;

an audio signal receiving section for receiving an audio
signal representing audio;

a detecting section for detecting the aspect information
10 from the video signal;

a stream generating section for generating encoded data
by encoding the video and audio signals by a predetermined
encoding technique and also generating an encoded stream as a
set of the encoded data;

15 management information generating section for generating
management information which is used to manage process of the
encoded stream, the management information including the
aspect information for each set of the encoded data; and

a writing section for storing the management information and the encoded stream as at least one file on a storage medium.

5 2. The data storage apparatus of claim 1, wherein when the set of the encoded data is treated as one sample, the management information generating section generates common aspect information for the video in each sample.

10 3. The data storage apparatus of claim 2, wherein when a plurality of samples are treated as one chunk, the management information generating section generates common aspect information for the video in each chunk.

15 4. The data storage apparatus of claim 3, wherein the management information generating section generates and stores the aspect information in a field of the management information for describing an attribute of each said sample.

5. The data storage apparatus of claim 4, wherein if the at least one file is compliant with the QuickTime standard, then the field is a Sample Table Atom (stbl) field, and

5 wherein if the at least one file is compliant with the MP4 standard, then the field is a Sample Table Box (stbl) field.

6. The data storage apparatus of claim 3, wherein the
10 management information generating section generates and stores the aspect information in a field of the management information for describing user data with respect to the encoded stream.

15 7. The data storage apparatus of claim 6, wherein if the at least one file is compliant with the QuickTime standard, then the field is a User Data Atom field, and

wherein if the at least one file is compliant with the MP4 standard, then the field is a User Data Box field.

8. The data storage apparatus of claim 4, wherein the management information generating section further stores access information, which is needed in accessing each said sample to which the aspect information is applied, in the field, the access information including at least one of the number of samples included in the chunk and the playback duration, data storage location and data size of each said sample.

10 9. The data storage apparatus of claim 1, wherein the video signal includes copy information indicating whether the video signal may or may not be copied, and

wherein the detecting section detects the copy information from the video signal, and

15 wherein the management information generating section further generates copy control information as another piece of the management information, the copy control information including copy protection information, showing a method of protecting the encoded stream from being copied in accordance

with the copy information, and status information indicating whether the copy protection information is valid or not.

10. The data storage apparatus of claim 9, wherein if
5 the copy information indicates that copy of the video signal is permitted at least once, then the management information generating section generates the copy control information.

11. The data storage apparatus of claim 10, wherein the
10 management information generating section generates common copy control information for the video in each said sample.

12. The data storage apparatus of claim 11, wherein the
management information generating section generates common
15 copy control information for the video in each said chunk.

13. The data storage apparatus of claim 12, wherein if
the at least one file is compliant with the QuickTime
standard, then the management information generating section

describes the copy control information in one of a Sample Table Atom (stbl) field and a User Data Atom (udta) field, and

wherein if the at least one file is compliant with the MP4 standard, then the management information generating
5 section describes the copy control information in one of a Sample Table Box (stbl) field and a User Data Box field.

14. A data storage method comprising the steps of:

receiving a video signal representing video and aspect
10 information to control aspect ratio of the video;

receiving an audio signal representing audio;

detecting the aspect information from the video signal;

generating encoded data by encoding the video and audio
signals by a predetermined encoding technique and also
15 generating an encoded stream as a set of the encoded data;

generating management information which is used to manage
process of the encoded stream, the management information
including the aspect information for each set of the encoded
data; and

storing the management information and the encoded stream
as at least one file on a storage medium.

15. The data storage method of claim 14, wherein when
5 the set of the encoded data is treated as one sample, the
step of generating the management information includes
generating common aspect information for the video in each
sample.

10 16. The data storage method of claim 15, wherein when a
plurality of samples are treated as one chunk, the step of
generating the management information includes generating
common aspect information for the video in each chunk.

15 17. The data storage method of claim 16, wherein the
step of generating the management information includes
generating and storing the aspect information in a field of
the management information for describing an attribute of each
said sample.

18. The data storage method of claim 17, wherein if the
at least one file is compliant with the QuickTime standard,
then the field is a Sample Table Atom (stbl) field, and

wherein if the at least one file is compliant with the
5 MP4 standard, then the field is a Sample Table Box (stbl)
field.

19. The data storage method of claim 16, wherein the
step of generating the management information includes
10 generating and storing the aspect information in a field of
the management information for describing user data with
respect to the encoded stream.

20. The data storage method of claim 19, wherein if the
15 at least one file is compliant with the QuickTime standard,
then the field is a User Data Atom field, and

wherein if the at least one file is compliant with the
MP4 standard, then the field is a User Data Box field.

21. The data storage method of claim 17, wherein the step of generating the management information further includes storing access information, which is needed in accessing each said sample to which the aspect information is applied, in the field, the access information including at least one of the number of samples included in the chunk and the playback duration, data storage location and data size of each said sample.

10 22. The data storage method of claim 14, wherein the video signal includes copy information indicating whether the video signal may or may not be copied, and

wherein the step of detecting includes detecting the copy information from the video signal, and

15 wherein the step of generating the management information further includes generating copy control information as another piece of the management information, the copy control information including copy protection information, showing a method of protecting the encoded stream
20 from being copied in accordance with the copy information, and

status information indicating whether the copy protection information is valid or not.

23. The data storage method of claim 22, wherein if the
5 copy information indicates that copy of the video signal is permitted at least once, then the step of generating the management information includes generating the copy control information.

10 24. The data storage method of claim 23, wherein the step of generating the management information includes generating common copy control information for the video in each said sample.

15 25. The data storage method of claim 24, wherein the step of generating the management information includes generating common copy control information for the video in each said chunk.

26. The data storage method of claim 25, wherein if the
at least one file is compliant with the QuickTime standard,
then the step of generating the management information
includes describing the copy control information in one of a
5 Sample Table Atom (stbl) field and a User Data Atom (udta)
field, and

wherein if the at least one file is compliant with the
MP4 standard, then the step of generating the management
information includes describing the copy control information
10 in one of a Sample Table Box (stbl) field and a User Data Box
field.

27. A data playback apparatus comprising:

a reading section for reading an encoded stream as a set
15 of encoded data and management information which is used to
manage process of the encoded stream from a storage medium,
the encoded data including a video signal representing video
and an audio signal representing audio that have been encoded
by a predetermined encoding technique;

a decoding section for decoding the encoded stream into the video signal and the audio signal;

an extracting section for extracting aspect information, which is defined for each said set of the encoded data to
5 control the aspect ratio of the video, from the management information; and

a superposing section for outputting the aspect information after having superposed the aspect information on the video signal.

10 28. A data playback method comprising steps of:

reading an encoded stream as a set of encoded data and management information which is used to manage process of the encoded stream from a storage medium, the encoded data including a video signal representing video and an audio
15 signal representing audio that have been encoded by a predetermined encoding technique;

decoding the encoded stream into the video signal and the audio signal;

extracting aspect information, which is defined for each
said set of the encoded data to control the aspect ratio of
the video, from the management information; and

outputting the aspect information that has been
5 superposed on the video signal.

29. A data storage apparatus comprising:

a video signal receiving section for receiving a video
signal representing video and copy information indicating
10 whether the video may or may not be recorded;

an audio signal receiving section for receiving an audio
signal representing audio;

a detecting section for detecting the copy information
from the video signal;

15 a stream generating section for generating encoded data
by encoding the video and audio signals by a predetermined
encoding technique and also generating an encoded stream as a
set of the encoded data;

a management information generating section for
20 generating management information which is used to manage

process of the encoded stream, the management information including copy control information that includes copy protection information, showing a method of protecting the encoded stream from being copied, and status information
5 indicating whether the copy protection information is valid or not; and

a writing section for storing the management information and the encoded stream as at least one file on a storage medium if the copy information indicates that the video may
10 be copied.